

15-8061

2209, 24 09, 1372

27573
S/190/61/003/009/008/016
B110/B101

AUTHORS: Firsov, A. P., Sandomirskaya, N. D., Tsvetkova, V. I.,
Chirkov, N. M.

TITLE: Kinetic and polymerization mechanism of α -olefins on
complex catalysts. IV. Polymerization of propylene in the
presence of TiCl_3 and $\text{Be}(\text{C}_2\text{H}_5)_2$

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 9, 1961,
1352-1357

TEXT: It was the purpose of the present paper to enlighten the role of
organometallic compounds of stereospecific complex catalysts. The polymeriza-
tion of propylene (P) in the presence of TiCl_3 and $\text{Be}(\text{C}_2\text{H}_5)_2$ was compared
with that carried out with TiCl_3 and $\text{Al}(\text{C}_2\text{H}_5)_3$ by G. Natta (see below). The
authors' experimental method was applied (Ref. 5: A. P. Firsov et al.,
Vysokomolek. soyed., 3, 1161, 1961). The α -modification of TiCl_3 was
prepared according to G. Brauer (Ref. 6: Rukovodstvo po preparativnoy

Card 1/6

27573

S/190/61/003/009/008/016
B11C/B101

Kinetics and polymerization ...

neorganicheskoy khimii (Manual for preparative inorganic chemistry), M., 1956). The distilled $\text{Be}(\text{C}_2\text{H}_5)_2$ contained 3% ether. Spectroscopically pure n-heptane was used as a solvent. Polymerization was conducted at 30-70°C and 220-585 mm Hg pressure, at a molar ratio of $\text{Be}(\text{C}_2\text{H}_5)_2$ to $\text{TiCl}_3 \approx 3$. As the polymerization rate proportionally depended on the concentration of P, for both $\text{Be}(\text{C}_2\text{H}_5)_2$ and $\text{Al}(\text{C}_2\text{H}_5)_3$, the rate constant k was calculated as follows: $k = w/c_{\text{C}_3\text{H}_6} \cdot G_{\text{TiCl}_3}$ liter/min·g TiCl_3 , where w = polymerization rate in mole C_3H_6 /min; $c_{\text{C}_3\text{H}_6}$ = P concentration in n-heptane at test temperature in mole/liter, and G_{TiCl_3} = weighed TiCl_3 sample in g. At temperatures of 30-70°C, the polymerization rate initially increased and became then constant. At 70°C, the rate became constant earlier with the $\text{Be}(\text{C}_2\text{H}_5)_2$ co-catalyst than with $\text{Al}(\text{C}_2\text{H}_5)_3$. TiCl_3 samples with surfaces of 9.2 and 5 m²/g TiCl_3 were used. For the steady region of polymerization, practically constant values (2.94 and 3.20, respectively) were obtained in Card 2/6

27573

S/190/61/003/009/008/016
B110/B101

Kinetics and polymerization ...

the case of $\text{Be}(\text{C}_2\text{H}_5)_2$ for the specific constant $k_{\text{spec}} = k/S_{\text{TiCl}_3}$; for $\text{Al}(\text{C}_2\text{H}_5)_3$, however, these values were less constant (1.50 and 1.11, respectively). Nearly the same activation energies of $16,200 \pm 150$ cal/mole were obtained, from the temperature dependences of the polymerization rate for $\text{TiCl}_3 + \text{Be}(\text{C}_2\text{H}_5)_2$, irrespective of the TiCl_3 surface. The activation energy for TiCl_3 and $\text{Al}(\text{C}_2\text{H}_5)_3$, which had been previously determined (Ref. 5, see above) was 13,600 cal/mole. It resulted from the temperature dependence of the molecular weight which had been determined viscosimetrically (in Tetralin at 135°C) according to $[\eta] = 2.5 \cdot 10^{-5} \cdot M_v^{1.00}$, and of the intrinsic viscosity at different concentrations, that the ratio $[\eta]/c_{\text{C}_3\text{H}_6}$ depended slightly on temperature and P concentration. In the laboratory of the authors, Yu. V. Kissin determined the crystallinity of polypropylene (PP), obtained in the presence of TiCl_3 and $\text{Be}(\text{C}_2\text{H}_5)_2$, by means of an NKC-14 (IKS-14) split-beam spectrometer. The 840 cm^{-1} band was used for the calculation, the 1170 cm^{-1} band as the internal standard

Card 3/6

27573
S/190/61/003/009/008/016
B110/B101

Kinetics and polymerization ...

of width. Fractionation was carried out by treating the polymers with boiling and cold heptanes. Polymerization temperature practically exerts no influence upon the stereoisomeric PP composition. The co-catalyst $\text{Be}(\text{C}_2\text{H}_5)_2$ is more stereospecific than $\text{Al}(\text{C}_2\text{H}_5)_3$ and other organometallic compounds. The crystallinity of PP somewhat increases with temperature. The authors previously (Ref. 5, see above) obtained, for the temperature dependence of the polymerization rate, the equation:

$$w = \frac{k_p k_i}{1 + k_p + k_i} S_{\text{TiCl}_4} c_0^* \quad (3),$$

where k_p = constant of the rate of growth; k_i = constant of the initiation rate; c_0^* = total concentration of active centers per unit surface; v = polymerization coefficient. For an almost equal binding strength of the ethyl radical and the growing polymer chain in the catalytic complex, $k_p \approx k_i$. As v varied from 11,400 to 1900, $(1/v)k_p \ll k_i$, and (3) becomes

Card 4/6

27573

S/190/61/003/009/008/016

B110/B101

Kinetics and polymerization ...

$w = k_p S_{TiCl_3} c_o^*$. As for the co-catalyst $Be(C_2H_5)_2$ an activation energy in the chain growth is assumed 2600 cal/mole higher than that of $Al(C_2H_5)_3$, the expression $(AS_{TiCl_3} c_o^*)$ for $Be(C_2H_5)_2$ is 45 times that for $Al(C_2H_5)_3$.

The effective activation energy of the breaking of the polymer chains with $Be(C_2H_5)_2$ as a co-catalyst was determined to be 16.2 kcal/mole according to the temperature dependence of the viscosity of the resultant PP. In the case of $Al(C_2H_5)_3$, it is close to the activation energy of the chain growth, which is 14,000 cal/mole for coarsely disperse $TiCl_3$ samples. The experimental results show that organometallic compounds that react with $TiCl_3$ form a catalytic complex; the alkyl group does not affect the activity of the catalyst. The alkyl group is removed from that point of the active bond where the monomer molecules are incorporated. The metal atom, on the other hand, enters the catalytic complex during the whole chain growth, and its influence upon polymerization rate, molecular weight, and stereoisomerism of PP is, therefore, much greater than that of the

Card 5/6

Kinetics and polymerization ...

27573
S/190/61/003/009/008/016
B110/B101

alkyl group. There are 3 figures, 3 tables, and 9 references: 2 Soviet and 7 non-Soviet. The three most recent references to English-language publications read as follows; Ref. 1: J. K. Stille, Chem. Revs, 58, 541, 1958; Ref. 2: G. Natta, J. Polymer Sci., 34, 21, 1959; Ref. 8: W. Heinen, J. Polymer Sci., 134, 545, 1959.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: November 1, 1960

Card 6/6

S/190/62/004/012/007/015
B101/B186

AUTHORS: Firsov, A. P., Sandomirskaya, N. D., Tsvetkova, V. I.,
Chirkov, N. M.

TITLE: Kinetics and mechanism of α -olefin polymerization on complex
catalysts. VI. Polymerization of propylene in the presence
of TiCl_3 and $\text{Be}(\text{C}_2\text{H}_5)_2$

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 12, 1962,
1812-1816

TEXT: In continuation of a previous paper (Vysokomolek. soyed., 3, 1352, 1961) it has been found, with regard to propylene polymerization with $\text{TiCl}_3 + \text{Be}(\text{C}_2\text{H}_5)_2$, that the rate of polymerization does not depend on the ratio of the catalyst components or on the concentration of $\text{Be}(\text{C}_2\text{H}_5)_2$, provided that the reaction temperature is 30°C and propylene concentration is constant. The process of chain termination was now studied more closely by determining the dependence of the intrinsic viscosity $[\eta]$ and the polymerization coefficient ν on the test conditions. ν is defined as being

Card 1/3

S/190/62/004/012/007/015
B101/B186

Kinetics and mechanism of...

equal to $\bar{M}/42$ or $\nu = 9.5 \cdot 10^2 [\eta]$. The following data are given for the temperature dependence of $[\eta]$ and ν :

Temperature, °C	30	60	70
$[\eta]$, dl/g	4.70	3.15	1.90
ν	4460	2990	1800

It was moreover found that $1/\nu$ is a linear function of $1/c_{C_3H_6}$. The following data were found for the dependence of $[\eta]$ and ν on $c_{Be(C_2H_5)_2}$ at 30°C:

$c_{Be(C_2H_5)_2} \cdot 10^2$ moles/liter:	1.33	3.46	17.3
$[\eta]$, dl/g	7.9	7.00	4.5
ν	7500	6650	4270

The evaluation of these data gives an activation energy for the termination by the monomer C_3H_6 of 26.4 kcal/mole, i.e. 10.2 kcal/mole more than the activation energy for the chain growth. The activation energy for the

Card 2/3

Kinetics and mechanism of...

S/190/62/004/012/007/015
B101/B186

termination by $\text{Be}(\text{C}_2\text{H}_5)_2$ is 16 kcal/mole. The ratio $k_{\text{term}}^{\text{Be}}/k_{\text{term}}^{\text{M}}$ is 10 at 30°C , but decreases with increasing temperature owing to the higher activation energy for the termination by the monomer. There are 3 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: July 3, 1961

Card 3/3

21

1ST AND 2ND SERIES PROCESSES AND PROPERTIES INDEX

SANDMIR-SKAYA, S.S.

THE PHOTOCOLORIMETRIC METHOD OF ANALYSIS OF NON-METALIC INCLUSIONS IN CARBON STEELS. N. F. LEVE AND S.S. SANDMIR-SKAYA. (Zavodskaya Laboratoriya, 1948, vol. 14, Sept., pp. 1043-1061). (In Russian). An account is given of experiments on the colorimetric determination in carbon steel of the following inclusions; Manganese oxide free and combined, ferrous oxide free and combined, manganese sulphide, ferrous sulphide, silica, alumina, and chromic oxide. Both visual and photographic colorimetric methods were used, the results obtained being compared mutually and with those obtained by chemical analysis. The photocolourimetric reactions were chosen so as to enable all the oxide and sulphide compounds present in the inclusions to be determined directly from the fraction obtained in the course of analysis. Inclusions in Armco iron and in several carbon steels were analysed by the photocolourimetric methods found to be most satisfactory; these were: (1) For manganese compounds: the oxide is dissolved from electrolytic residue by ammonium sulphate

East European Metallurgy, AS UKR SSR

ASS-ILA METALLURGICAL LITERATURE CLASSIFICATION

1950 NOMINALLY 1951 ONE OR 151

solution, sulphides being dissolved by subsequent treatment with 1:3 sulphuric acids, the manganese in each solution being photoelectrically determined using a light green filter after oxidation; (2) for iron compounds; the iron in the various fractions produced in the decomposition of the carbides is determined as the coloured ferrisulphosalicylic complex, special modifications being necessary when the amount of manganese present exceeds 0.05 mg.; (3) for silica: this is determined as the silicate ion forming a yellow coloration with ammonium molybdate solution, the solution before the addition of molybdate being used for obtaining the zero of the photocolometric scale; (4) for chromium compounds: the chromium is determined as the diphenyl carbaside complex, pure potassium dichromate solution being used for the calibration; and (5) for aluminium compounds; the reaction of aluminium with cupferron is used, the calibration of the photocolometric scale being carried out with solutions of pure aluminium alums; as chromium affects this determination, the zero is obtained with distilled water to which chromate solution has been added to give an appropriate chromium content. S. K.

SANDOMIRSKAYA, S. S.

4

Luminescence analysis of nonmetallic occlusions. N. P. Dik
Leva and S. S. Sandomirskaya. *Zhurnal Fiz. Khim.* 31, 711-12
(1956).—A no. of nonmetallic occlusions (including corun-
dum and silicates) in rocks and synthetic minerals exhibit
primary luminescence in ultraviolet light when examd. in an
ultraviolet microscope. A secondary luminescence, usually
very bright, is obtained by treating the sample with lumines-
cent dyes. The luminescence can be studied microphoto-
graphically by using suitable color filters, sometimes with a
dark background, or by color photography. W. M. S.

Sm ①

Ukr. Sci. Res. Inst. Metallurgy

SOV/137-57-6-9758

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 6, p 65 (USSR)

AUTHORS: Leve, N.F., Sandomirskaya, S.S.

TITLE: A Method of Determining the Nature of Nonmetallic Inclusions by Luminescence (Lyuminestsentnyy metod opredeleniya prirody nemetallicheskikh vklyucheniyy)

PERIODICAL: Tr. Ukr. n.-i. in-ta metallov, 1956, Nr 2, pp 272-283

ABSTRACT: Ref. RZhMet, 1956, Nr 2, abstract 1799

Card 1/1

137-58-4-8499

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 310 (USSR)

AUTHORS: Leve, N. F., Sandomirskaya, S. S.

TITLE: Luminescent Analysis of Nonmetallic Inclusions (O lyumines-tsentsnom analize nemetallicheskih vklyucheniy)

PERIODICAL: V sb.: Fiz. -khim. osnovy proiz-va stali. Moscow, AN SSSR, 1957, pp 645-649. Diskuss. pp 650-655

ABSTRACT: A method of luminescent analysis of nonmetallic inclusions, distinguished by very high sensitivity, relative simplicity and speed, clear definition, and high contrast of the objects observed, is described. It is shown that certain nonmetallic inclusions (quartz, corundum, silicates, etc.) manifest primary luminescence (L) under the action of ultraviolet rays, and acquire a distinct secondary L when treated with luminescent penetrants. A method of preparing the penetrants, methods of observing primary (natural) L and methods of exciting and observing secondary (induced) L were developed. The sources of radiant energy were the SVDSH-250 and PRK-4 mercury-quartz lamps, producing 400-250 mm wavelength ultraviolet rays. In-

Card 1/2

137-58-4-8499

Luminescent Analysis of Nonmetallic Inclusions

selected species by species with the aid of the polarizing microscope, transferred to quartz glass, and examined in transmitted light in the MUF-2 ultra-violet microscope. The methodological portion of the investigation was conducted with native materials (quartz, corundum, silicates, and sulfides of Fe, Mn, etc.) and with synthetic compounds (oxides and sulfides of Fe, Mn, and others), similar in composition to nonmetallic inclusions. L may be investigated visually or by color photography.

G. L.

1. Luminescence--Applications
2. Luminescent materials--Determination

Card 2/2

SANDOMIRSKA, S.S.

SANDOMIRSKA, S.S.

1A(5) 25(5) PAGE 1 BOOK REPRODUCTION 807/1574

Reprint. Reprint by author-illustrator last year metal

Vysokomaya skorost' tekhnologii v metallurgii, avtorov
Shchegolev, S. S. (Introduction of New Techniques and Technology
in Ukrainian Metallurgical Plants; Collection of Articles, Vol. 3) Kyiv,
Naukova Dumka, 1978. 192 p. 1,000 copies printed.

Reprint. Reprint by author-illustrator last year metal

Reprint. The book is intended for metallurgists employed in rolling and
slabbing operations.

CONTENTS: This is a collection of 11 Ukrainian articles, compiled by 22
authors, some of whom are referred to as eminent specialists. The subjects
dealt with in the articles are: use of limestone-silicon slag in making pig
iron, use of blast-furnace gas under increased pressure, use of oxygen in
making of steel, use of oxygen in making of steel, use of oxygen in making
of steel, use of oxygen in making of steel, use of oxygen in making of steel,
with direct references to actual plants and certain operational
practices are also featured. Introduction of full mechanism of roll-
ing processes at steel-works is taking place. Numerous diagrams accompany
the text. Some articles have bibliographic entries, mainly Soviet.

TABLE OF CONTENTS:

Introduction of New Techniques (cont.)

Shchegolev, S.S., Ye. I. Babinchuk, S.S. Zaporozh, P. Ye. Kravtsov, and
S.I. Stetsko. The use of limestone-silicon slag in the production of steel for
making wheels and tires 87

Zavo, S.S., G.A. Kuznetsov, and S.S. Sandomirskaya. Effect of Manganese
Additions Upon Some Properties of Sintered Steel, Documented by
Calcium-Silicon 92

Alkhomov, P.A., V.V. Kuznetsov, and Ye. Ye. Kuznetsov. Ways of increas-
ing the durability and wear-resistance of mills in rolling mills 105

Shchegolev, P. Ye. General Possibilities of Augmenting the Performance
of Small-roll Slabbing Mills Working Large-size Slabs 117

Pilgner, I.B. Steel Rolling According to Technological Performance
Charts; Compilation of Charts 140

Cont 3/4

L 12461-63

EWI(1)/EWP(q)/EWI(m)/BDS/ES(s)-2 AFFTC/ASD/SSD Pt-4 JD
S/185/63/008/003/001/009

AUTHOR: Sandomirskaya, V. L. and Selisskiy, Ya. P. 67

TITLE: Changes in elasticity, magnetostriction²¹ and electrical resistance²¹
of iron-aluminum alloys during ordering

PERIODICAL: Ukrains'kyy Fizychnyy Zhurnal, v. 8, no. 3, 1963, 284-288.

TEXT: It is shown that in alloys, which contain 8 - 16% by weight of Al, the change in electrical resistance and in magnetostriction is as expected for ordered alloys. The change in Young's modulus is anomalous in comparison with other ordered alloys during similar thermal treatment. The alloys were made in open induction furnace and cast into 5 kg ingots which were further forged into rods 5 mm in diameter. Resistance was measured potentiometrically across a distance of 100 mm between the potentiometer contacts. Young's modulus was measured by the resonance method of forced longitudinal vibrations of ultrasonic frequency. The article contains 2 graphs and a 12-item bibliography.

ASSOCIATION: TsNIICM (Central Scientific Research Institute of Ferrous Metallurgy and Institute of Precision Alloys, Moscow.)

Card 1/1

L 62111-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) IJP(c) ID
ACCESSION NR: AP5004278

UR/0126/69/019/001/0152/0154

AUTHOR: Bul'cheva, Z. N.; Borodkina, M. M.; Sandomirskaya, V. L.

TITLE: Investigation of the orientation and magnetic properties of Fe-Al magnetostriction alloys

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 152-154

TOPIC TAGS: Iron alloy, magnetostriction, magnetostriuctive element, heat treatment, vacuum refining, magnetic switch, Fe-Al alloy

ABSTRACT: It has been shown that an orientation of type $(110) \sqrt{001} + (100) \sqrt{001}$ may be created in an Fe-Al alloy with 10% Al instead of the $(100) \sqrt{011}$ orientation which is characteristic for this alloy by using special technological treatment (rolling with cumulative reductions to limits of 60-70%, and several intermediate annealings). This type of orientation makes it possible to obtain high values of magnetostriction (up to $70 \cdot 10^{-6}$) in the direction of rolling. Grain-oriented Fe-Al alloys with such a high magnetostriction may be used for making magnetostriction converters. The authors studied the possibility for increasing the magnetostriction in Fe-Al alloys with 6-14% Al by analogous orientation. As a consequence of the fact that the direction of passive magnetization in the Fe-Al system changes at 12% Al from $\sqrt{100}$ to $\sqrt{111}$ in the ordered state (the constant of magnetic anisotropy K_1 changes from 10^6 to 10^7 erg/cm³), the orientation of type $(110) \sqrt{001} + (100) \sqrt{001}$ is favorable for increasing the magnetostriction. Card 1/2

L 62111-65

ACCESSION NR: AP5004278

2
tropy passes through zero at 12% Al), it was to be expected that obtaining the orientation (100) $\overline{001}$ + (100) $\overline{001}$ would have different effects on the magnetic parameters of the alloys in the indicated range of concentrations. The alloys were vacuum smelted. Armco iron and AVCOO aluminum were used as initial charge materials. The ingots were forged into sheet bars (heating temperature 1100-1150°C) and hot rolled at a temperature of 1050-1100°. Then they were subjected to "warm" rolling according to the following two sets of conditions: 1) cumulative reduction by 55-65% and two intermediate heat treatments; 2) cumulative reduction by 92% without intermediate heat treatment. The highest magnetostriction for all alloys was obtained for samples which had been rolled with intermediate heat treatment, the maximum corresponding to an aluminum content of 8-10%. Rolling without intermediate heat treatments with a total reduction of 92% leads to some increase in magnetostriction in the region from 9 to 12% Al in comparison with the forged samples. The results of the study are presented in the form of a graph. Orig. art. has 3 figures and 2 tables.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut Cherny Metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 22 Feb 64

ENC: 00

WB C 01. 02, 03

NO REF SOV: 002

OTHER: 002

Card 2/2 *llc*

L 39304-65 EWT(1)/EPA(s)-2/EWT(m)/EWP(w)/EWA(d)/EPR/t/EWP(t)/EWP(k)/EPA(bb)-2/
EWA(c)/EWP(b) Pf-4/Ps-4/Pt-10 IJP(c) JD/HW

ACCESSION NR: AP5004278

S/0126/65/019/C01/0152/0154

AUTHOR: Bulycheva, Z. N.; Borodkina, M. M.; Sandomirskaya, V. L.

TITLE: Investigation of the orientation and magnetic properties of Fe-Al
magnetostriction alloys

TOPIC TAGS: iron alloy, magnetostriction, magnetostrictive element, heat treatment,
vacuum refining, magnetic switch/Fe-Al alloy

ABSTRACT: It has been shown that an orientation of type (110) [001] + (100) [001] may be created in an Fe-Al alloy with 10% Al instead of the (100) [011] orientation which is characteristic for this alloy by using special technological treatment (rolling with cumulative reductions to limits of 60-70%, and several intermediate annealing). This type of orientation makes it possible to obtain high values of magnetostriction (up to $70 \cdot 10^{-6}$) in the direction of rolling. Grain-oriented Fe-Al alloys with such a high magnetostriction may be used for making magnetostriction converters. The authors studied the possibility for increasing the magnetostriction in Fe-Al alloys with 6-14% Al by analogous orientation. As a consequence of the fact that the direction of passive magnetization in the Fe-Al system changes at 12% Al from [100] to [111] in the ordered state (the constant of magnetic anisotropy passes through zero at 12% Al), it was to be expected that obtaining the

Card 1/2

L 39304-65

ACCESSION NR: AP5004278

orientation (100)[001] + (100) [001] would have different effects on the magnetic parameters of the alloys in the indicated range of concentrations. The alloys were vacuum smelted. Armco iron and AVOOO aluminum were used as initial charge materials. The ingots were forged into sheet bars (heating temperature 1100-1150°C) or hot rolled at a temperature of 1050-1100°. Then they were subjected to "warm" rolling according to the following two sets of conditions: 1) cumulative reduction by 55-65% and two intermediate heat treatments; 2) cumulative reduction by 92% without intermediate heat treatment. The highest magnetostriktion for all alloys was obtained for samples which had been rolled with intermediate heat treatment, the maximum corresponding to an aluminum content of 8-10%. Rolling without intermediate heat treatments with a total reduction of 92% leads to some increase in magnetostriktion in the region from 9 to 13% Al in comparison with forged samples. The results of the study are presented in the form of a graph. Orig. art. has: 3 figures, 2 tables.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut chernyy metallurgii im. I. P. Bardina (Central Scientific Research Institute of Ferrous Metallurgy)

SUBMITTED: 22Feb64

ENCL: 00

SUB CODE: EM,DP

NO REF SOV: 002

OTHER: 002

Card 2/2 JO

BULYCHEVA, Z.N.; BORODKINA, M.M.; SANDOMIRSKAYA, V.I.

Investigating the texture and the magnetic properties of Fe-Al
magnetostrictive alloys. Fiz. met. i metalloved. 19 no.1:152-
154 Ja '65. (MIRA 18:4)

L 38469-66 EWT(m)/EWP(k)/T/EWP(t)/ETI IJP(c) HW/JH/JD
 ACC NR: AP6019503 SOURCE CODE: UR/0129/66/000/006/0036/0038
 AUTHOR: Bulycheva, Z. N.; Sandomirskaya, V. L. 37
 ORG: TsNIICHERMET 3
 TITLE: Recrystallization of iron aluminum alloys
 SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 6, 1966, 36-38
 TOPIC TAGS: metal recrystallization, iron containing alloy, aluminum containing alloy
 ABSTRACT: The investigations were made on alloys containing from 2 to 18% aluminum. The samples were melted in a laboratory vacuum furnace with a capacity of 7 kg. The charge consisted of iron refined in hydrogen (99.98%) and grade AB000 aluminum. The cast billets were rolled into sheets 3 mm thick. The heating temperature during deformation was from 1100 to 1170°C and the hot rolled sheets were normalized at 900°C. Cold working of the sheets was done by rolling to different thicknesses (down to 0.3 mm). Hardened samples were annealed in quartz ampoules, evacuated to a residual pressure of 10⁻³ mm Hg. The holding temperature was from 600 to 1200°C, and the holding time from

UDC: 620.186.5:546.72'669.71

Card 1/2

L 38469-66

ACC NR: AP6019503

6

5 min to 2 hours. The ampoules with the samples were cooled in air. The end surface of the samples was polished and etched with a reagent containing 30 mg HCl, 10 grams FeCl_3 , and 1200 mg H_2O . Quantitative evaluation of the changes in the grain size was done by the method of random sections. It was found that with an increase in the aluminum content up to 10%, the grain size increased at all annealing temperatures, particularly at 1200°C . Then, the grain size almost does not change up to 16% aluminum. In an alloy with 18% aluminum, the grain size decreases. It can be assumed that the decrease in the rate of the growth in the grain size is connected with the degree of ordering at given concentration. Orig. art. has: 3 figures and 1 table.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002

Card 2/2

SANDOMIRSKIY, A. B.; AL'TOVSKAYA, N. P.; TRIFONOVA, G. I.

Brightness indicatrices at altitudes of 8 to 17.5 km. Izv.
AN SSSR. Ser. Geofiz. no.6:958-966 Je '64. (MIRA 17:7)

SANDOMIRSKIY, A.B.; AL'TOVSKAYA, N.P.; TRIFONOVA, G.I.

Seasonal course of brightness at altitudes of up to 17.5 km.
Izv. AN SSSR. Ser. geofiz. no.7:1121-1127 J1 '64.

(MIRA 17:7)

L 9580-66 EWT(1)/FS(v)-3/ECC TT/GW

ACC NR: AP6001974

SOURCE CODE: UR/0362/65/001/012/1270/1278

AUTHOR: Rozenberg, G. V.; Sandomirskiy, A. B.; Trifonova, G. I.

ORG: Academy of Sciences SSSR. Institute of Atmospheric Physics (Akademiya nauk SSSR. Institut fiziki atmosfery)

TITLE: Brightness profile of the day horizon of the planet Earth

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 1, no. 12, 1965, 1270-1278

TOPIC TAGS: atmospheric optics, brightness profile, twilight, satellite experiment, day sky brightness.

ABSTRACT: A simplified method is advanced for computing the brightness of the light aureole seen from a spaceship in the daytime at the limb of a planet. Though the planet Earth is emphasized, the method may be applied to other planetary atmospheres as well. The only case treated is one where all the regions of the atmosphere cut by the line of vision are in the hemisphere illuminated by the sun, i.e., the day horizon. The influence of various factors on the vertical and horizontal brightness structure of the light aureole is discussed. Specifically, the effect on the computations of two aerosol layers located at heights of about 11 and 19 km is shown graphically. Data obtained from spaceships on aerosol distribution during twilight were used. It was found that the aerosol layers caused a noticeable increase in brightness and could be observed from the spaceship as bands of enhanced

Card 1/2

UDC: 551.593.5

I 9580-66

ACC NR: AP6001974

brightness stretching along the day horizon. The contrast between the bands is not great and varies with increased wavelength and the height of the layer. In general, photographs of the Earth's surface taken from the Vostok and Voskhod spaceships show that the part of the planet illuminated by the sun appears in the light blue haze of light scattered by the atmosphere. Spaceship investigations of this type open new possibilities of identifying and studying aerosol layers in the stratosphere, the height distribution of ozone, water vapor, sodium, and other atmospheric components. Orig. art. has: 18 formulas and 5 figures. [DM]

SUB CODE: 04, 22 SUBM DATE: 16Jul65/ ORIG REF: 007/ OTH REF: 001
ATD PRESS: 4164

beh
Card 2/2

I. 08525-67 FSS-2/ENT(1)/EEC(k)-2/FCC IJP(o) JGS/TT/GW
ACC NR: AP6034771 (A) SOURCE CODE: UR/0362/66/002/010/1046/1054

AUTHOR: Driving, A. Ya.; Mikhaylin, I. M.; Rozenberg, G. V.; Sandomirskiy, A. B.;
Trifonova, G. I. 41

ORG: Institute of Physics of the Atmosphere, Academy of Sciences SSSR (Institut
fiziki atmosfery, Akademiya nauk SSSR) B

TITLE: Photometric analysis of the twilight aureole photographs taken from the
Vostok-6 spaceship 10

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 10, 1966,
1046-1054

TOPIC TAGS: twilight, spacecraft camera, satellite experiment, aerosol layer,
photometric analysis, atmospheric light scattering, aureole

ABSTRACT: The procedures followed in the photometric analysis of photographs of the
twilight aureole taken on 17 June 1963 over the South Atlantic from the Vostok-6
spaceship, and the conclusions drawn from analysis of them are described. To a con-
siderable extent, the findings support the preliminary evaluation of the photographs
reported by Rozenberg and astronaut Nikolayeva-Tereshkova [Izv. AN SSSR, Fizika
atmosfery i okeana, 1, no. 4, 1965]. The photographs were taken with a "Konvas"
camera (focal length, 135 mm) using 35-mm 10-H film and no light filters. The MF-4
microphotometer was used in the processing. Averaged data clearly show the existence

UDC: 551.593.5:629.195

Card 1/2

L 08525-67

ACC NR: AP6034771

6

of the aerosol layer at a height of about 19 km, thus verifying the earlier evaluation. Additional information as to the seasonal and geographic variations of the height structure of the layer and absolute values of the coefficient of scattering at different heights is believed necessary in order to determine the origin of the layer. Orig. art. has: 8 figures and 24 formulas.

SUB CODE: 22, 04/ SUBM DATE: 07Jun66/ ORIG REF: 010/ OTH REF: 001/ ATD PRESS: 5103

Card

2/2

LS

SANDOMIRSKIY, A. N.

TVERTSYN, V. S. and SANDOMIRISKY, A. N. "On the problem of the 'protective action' of the oxide layer on aluminum", Trudy Mariysk. gos. ped. in-ta, Vol. VII, 1948, p. 163-66.

SO: U-3042, 11 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 7 1949).

ZUBOV, Vasilii Timofeyevich; SANDOMIRSKIY, A.S., nauchn. red.;
MOKRETISOV, A.M., red.

[Principles of industrial mechanization and automation]
Osnovy mekhanizatsii i avtomatizatsii proizvodstva. Mo-
skva, Vysshaia shkola, 1964. 197 p. (MIRA 17:11)

L 21029-66 FSS-2/EWT(1)/EEC(k)-2/EWA(d)/T IJP(o) TF/GS/GW

ACCESSION NR: AT5023564

UR/0000/65/000/000/0062/0064

AUTHOR: Feoktistov, K. P.; Rozenberg, G. V.; Sandomirskiy, A. B.; Sergeevich, V. N.; Sonechkin, D. M.

TITLE: Optical observations from the Voskhod spacecraft

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 62-64

TOPIC TAGS: Vostok, Voskhod, haze photography, cloud photography, cyclone, anti-cyclone, gegenschein, Glenn firefly

ABSTRACT: A number of optical observations were carried out by the Voskhod crew as a followup to experiments conducted by the Vostok-series capsules. Preliminary results of the following experiments are discussed: 1) photography of the haze which blankets the Earth's limb on the daylight side; 2) color photography of the dawn with the capsule on the night side; 3) observation over the planet's limb of a weak (pale-white with a yellow-green tone) glow region extending along and 2.5-3° above the horizon, and particularly evident against the polar glow; 4) observation of small luminescent particles (dust) first reported by Astronaut John Glenn; and

Card 1/2

L 21029-66

ACCESSION NR: AT5023564

5) photography of the cloud cover (cyclone and anticyclone) against the water surface. Orig. art. has: 4 figures. [YK]

ASSOCIATION: none

SUBMITTED: 02Sep65

NO REF SOV: 000

ENCL: 00

OTHER: 000

SUB CODE: ES, SV

ATD PRESS: 4094

Card 2/2 BK

SANKIN, D.I., kand. ekon. nauk; SEMINOV, S.I., kand. ekon. nauk;
BEREZNOY, N.I., kand. ekon. nauk; ZHDANOV, A.I., kand.
ekon. nauk; GORCHAKOV, A.A., inzh.; ZAKHAROV, V.V., inzh.;
YUNOVICH, I.M., inzh.; RYVKIN, A.S., inzh.; KOVRIGIN, V.V.,
ekonomist; DIDENKO, S.I., kand. ekon. nauk; SANDMIRSKIY,
A.T., ekonomist; GONCHARENKO, B.L., kand. ekon. nauk; KOTOV,
V.F., inzh.; EYDEL'MAN, B.I., red.

[Handbook for the economist and planner in an industrial
enterprise] Spravochnik ekonomista i planovika promyshlen-
nogo predpriatiia. Moskva, Ekonomika, 1964. 698 p.
(MIRA 17:6)

Polymerization of butadiene in emulsions. VI. The properties of fractions and transformations of the soluble fraction of rubber. B. A. Dogadkin, D. M. Sandomirskii and P. Sharkevich. *Gidrol.* (U. S. S. R.) 6, 109-211 (1940); cf. C. A. 31, 4001. Synthetic latex, prepd. by polymerization of butadiene in emulsion, was divided into 2 fractions: (1) sol. (30% of dry latex) and (2) insol. in CCl₄ at room temp. The fractions had, resp., d_4^{20} 0.801, 0.880, n_D^{20} 1.518, 1.520; mol. refraction 18.30, 18.10, 0.100, 0.101, unsatn. 0.03, —. The sol. fraction was transformed into an insol. product by heating in O or N; this process in the presence of O was accompanied by absorption of O and sepn. of water. A toluene soln. of the sol. fraction formed a gel during heating in N in the presence of diazaminobenzene. A decrease in viscosity was observed during heating in O in the presence of PhNH₂, MeNHPh, H₂NC₆H₄NPh, PhNO₂, PhNH₂, PhNH₂, MeNHPh and PhOH. The absorption of O and sepn. of water NPh and PhOH. The absorption of 2 mols. of polymer were explained by condensation of 2 (at the double-bonded C) and elimination of one H from each C, by combination with O, in the process was probably the condensation of the mol. or of local chains of the mol., through formation of

rings by breaking of double bonds. VII. Disposition of butadiene in emulsions. D. M. Sandomirskii and B. A. Dogadkin. *Ibid.* 215-21. An insol. fraction of rubber, obtained as described above, was dissolved in toluene, xylene and other solvents at 80-100°, but not in CCl₄. Soln. of this fraction in these solvents was promoted by salts of fat acids. The fraction was not sol. in the various solvents at 100-30° in N, but dissolved in the same solvents at the same temp. in O or air. Therefore, the solv. of this fraction depended on the influence of O. The fraction which dissolved in toluene at 100° (after removal of O, solvent and drying) had d_4^{20} 0.807, n_D^{20} 1.5190. A CCl₄ insol. fraction probably had a spatial structure consisting of main-valency chains connected by local chem. bonds. A. A. Podgorny

30

Effect of temperature and rate of stretching on the strength of vulcanizates. B. A. Dugastin and D. M. Kahan. *Rev. 13, 247-74 (1954)*. *J. of. C.A.* 49, 41044.
Rings of vulcanized rubbers A (rubber 100, S 2, ZnO 5, tetramethylthiuram disulfide 0.5) and B (rubber 100, ZnO 5, tetramethylthiuram disulfide 5) were broken by tension. The stress at rupture σ (referred to the actual cross-section) was σ^* ; $\dot{\epsilon}$ is the rate of extension, and ϵ and α are constants. If ϵ increases with $\dot{\epsilon}$ because, at highest $\dot{\epsilon}$, disintegration of the crystal fraction (present in the unstretched rubber) has less time to occur. As this disintegration is more rapid at higher temps. T , σ decreases when T increases. Between 10 and 80°, $\sigma = \sigma_0 e^{-U/RT}$; the const. U was, for A and B, resp., 2800 and 2600 cal./mole at $\dot{\epsilon} = 1.5$ mm./min., 4000 and 4300 at $\dot{\epsilon} = 10.3$, 4800 and 4900 at 100 mm./min., and 4300 and 4300 at 1000 mm./min. U is related to the 4000 for butadiene-styrene rubber at $\dot{\epsilon} = 100$, 6700 for Ne-butadiene rubber at $\dot{\epsilon} = 200$, 1000 for natural rubber at $\dot{\epsilon} = 200$, 7200 for Butyl rubber at $\dot{\epsilon} = 200$, 12,000 for chloroprene rubber at $\dot{\epsilon} = 10$, and 7100 for oxidized Ne-butadiene rubber at $\dot{\epsilon} = 10$. At 100° and above, σ of A and B was independent of $\dot{\epsilon}$ as long as $\dot{\epsilon}$ was < 100 and decreased but little as $\dot{\epsilon}$ increased. The total elongation of A decreased when T increased and $\dot{\epsilon}$ decreased, showing that no plastic flow was taking place.
J. J. Silbermann

SANDOMIRSKIY, D. M.

Formation of rubber films from solutions and aqueous dispersions. D. M. Sandomirskiy and K. Gagina (Sci. Research Inst. Rubber Ind., Moscow). *Kolloid. Zhur.* 15, 448-54 (1953).—Films, 0.2 mm. thick, made by drying latex of natural rubber (Revertex) (I) or butadiene-styrene latex (II), had tensile strengths of 8.2 and 3.8 kg. wt./sq. cm., total elongation 775 and 625%, residual elongation 33 and 30%, and residual tension 45 and 15%, resp. When such films were dissolved in benzene and the solvent was vaporized, the remaining films had smaller tensile strengths (4.5 and 2.0), total elongation (575 and 375%), and residual elongation (10 and 8%), and a larger residual tension (72 and 50% for I and II, resp.). The films from aq. dispersions had a smaller residual elongation, but almost recovered their initial shape after swelling in benzene vapor and drying in a vacuum, while the diam. of those from solns. contracted (e.g., by 15%) and their thickness increased (e.g., by 30%). The amt. of H₂O vapor adsorbed by a film was greater (25-26%) for films from a soln., while the other films absorbed, e.g., 10% H₂O vapor. In the films from aq. dispersions, the hydrophilic components of the latex form a net, while in the films from solns. these components are present as discrete fragments. (3)

J. J. Bikerman

10-12-54

mlk

FUKS, G.I.; SANDOMIRSKIY, D.M.

Third All-Union Conference on Colloidal Chemistry. Koll.zhur. 16
no.2:154-160 '54. (MLRA 7:3)
(Colloids)

SANDOMIRSKIY, D.

6000

V. The rheological properties of a glycerol. A. Korotkova
and D. Sandomirskiy (Sci. Research Inst. Rubber Ind.
a Moscow). *Kolloid. Zhur.* 17, 243 (1955) — In an app. (not
described) based on tangential displacement of a plate, gly-
cerol showed non-Newtonian behavior, whereas 80% soln. of
rosin in turpentine was Newtonian. Also in *Kolloid J.*
U.S.S.R. 17, 243 (1955) (Engl. translation).

J. J. Bikerman

SANDOMIRSKI D.M.

Formation of rubber films from solutions and aqueous dis-
persions. D. M. Sandomirskii and K. G. Gashin. (Sci.
Research Inst. Rubber Ind., Moscow). Rubber Chem. and
Technol. 28, 627-33 (1955) (in English). See C.A. 48,
7327b. C. C. Davis

2 m
①
A
m

SANDOMIRSKIY, D. M., DOGADKIN, B. A., KHELLEK, T. Y., FEDROVA, S. A., TSVETKOV, A. J.
BAKSHT, O. V., and RASHIVAHINA, K. Y.

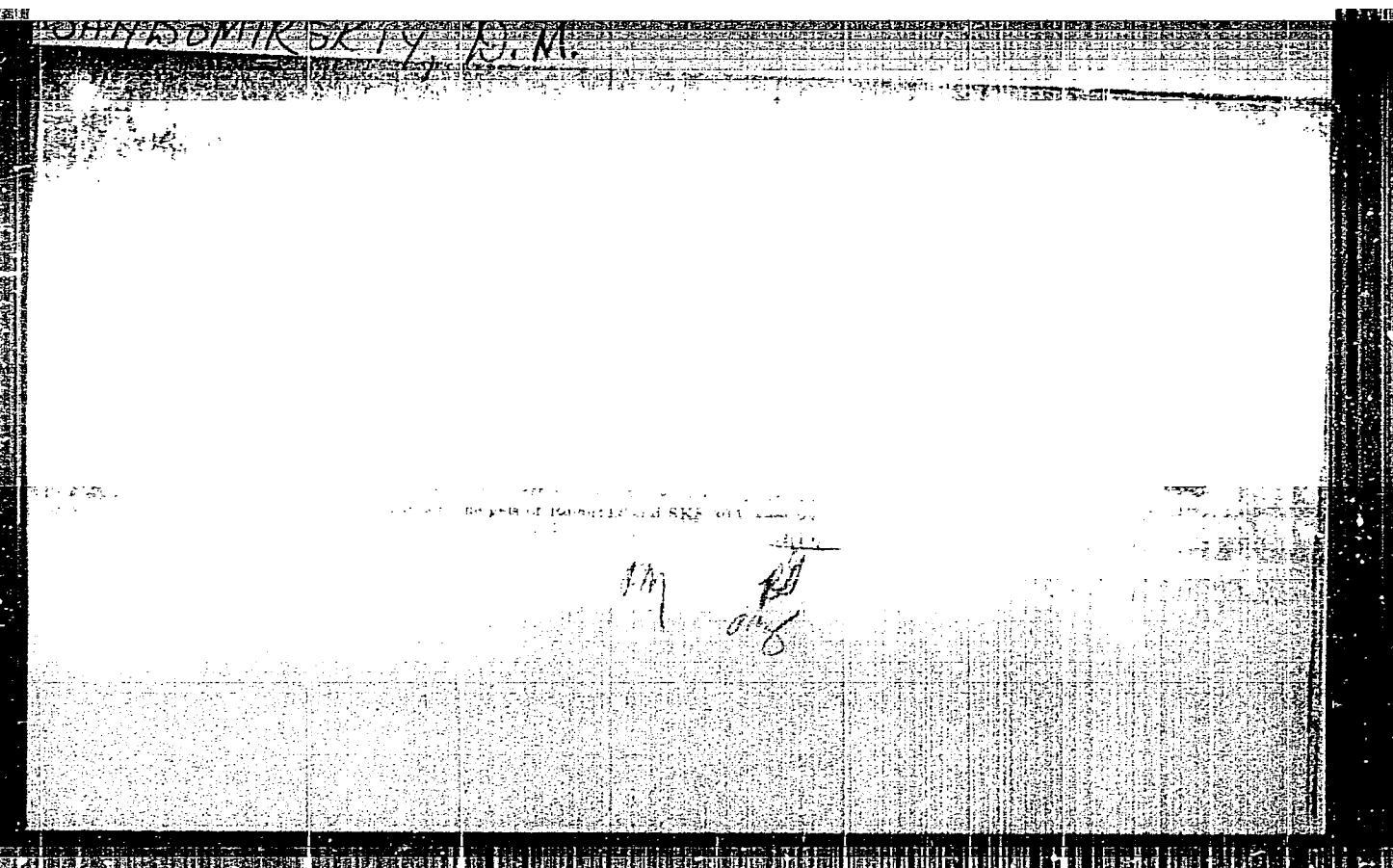
"Oxidation of Buna in solution," a paper presented at the 9th Congress
on the Chemistry and Physics of High Polymers, 28 Jan-2 Feb 57, Moscow, Moscow
Polytechnic Institute.

B-3,084,395

SANDONIRSKIY, D.; ZARETSKIY, M.

Some problems in manufacturing foam goods from latex. Kauch. i rez.
16 no.3:32-36 Mr '57. (MIRA 12:3)

1. Institut tonkoy khimicheskoy tekhnologii imeni Mendeleyeva.
(Foam rubber)



SOV/138-58-12-3/17

AUTHORS: Sandemirskiy, D. M. and Shmurak, I. I.

TITLE: Concentration of Latex by Electrodecantation (Kontsen-
trirovaniye lateksa elektrodekantatsiyey)

PERIODICAL: Kauchuk i Rezina, 1958, Nr.12, pp 8 - 10 (USSR)

ABSTRACT: Recently this method has been used for concentrating natural latex (Ref. 1 - 5). The authors investigated the effect of the rate of the current, the voltage gradient in the bath, the number of diaphragms in the same, the viscosity of the latex, and the electro-kinetic potential on the process of electrodecantation. Three types of natural latex were tested: (A) non-concentrated natural latex, (B) dissolved concentrate obtained by centrifugation ("Kvaliteks") and (C) dissolved concentrate of vulcanised latex ("Revul'teks"). The properties of these latexes are tabulated. Fig.1 shows the setting up of the apparatus. The latex is subjected to the action of an electric current of defined parameters, and the changes in the concentration of the latex in the top layer in relation to time are defined. The time during which the content of dry substance of the latex in the top layer increases to 55% is taken as characteristic rate

Card 1/3

SOV/138-58-12-3/17

Concentration of Latex by Electrodeposition

of concentration. The dependence of the rate of concentration on the rate of the current at a constant gradient is shown in Fig.2, and the dependence of the rate of concentration of the latexes B and C on the voltage gradient at constant current rate in Fig.3. Fig.4: the effect of intermediate diaphragms on the rate of concentration of the latex. In these experiments, the rate of concentration was defined by the increase of the concentration in the top layer of the latex. It is, however, necessary to know the concentration at all heights of the bath. A test was, therefore, carried out in which samples of latex were taken at all depths of the latex (Fig.5), and it can be seen that the concentration of the initial latex is maintained at approximately $1/3$ rd of the height of the bath. Fig.6 gives the kinetic concentration curves of all investigated latexes. These tests were taken at various rates of current. It was also found that intermediate diaphragms increase the rate of concentration of the latex: this is due to the shortening of the path

Card 2/3

SOV/138-58-12-3/17

Concentration of Latex by Electrodeposition

of the globules. There are 6 Figures, 1 Table and
5 English References.

ASSOCIATION: Institut tenkoy khimicheskoy tekhnologii im. M. V.
Lomonosova (Institute of Chemical ^{Precision} Technology im. M. V.
Lomonosov)

Card 3/3

SANDOMIRSKIY, D.M.

AUTHOR: Sandomirskiy, D.M., Vdovchenkova, M.K.

69-20-1-11/20

TITLE: Investigation of Coagulation of Rubber Latexes by Means of Radio-active Isotopes (Issledovaniye koagulyatsii kauchukovykh lateksov pri pomoshchi radioaktivnykh izotopov)

PERIODICAL: Kolloidnyy Zhurnal, 1958, Vol XX, # 1, pp 80-83 (USSR)

ABSTRACT: The interaction of a latex with an electrolyte produces a polymer. It is important to know the threshold of coagulation, i.e. the minimum quantity of electrolyte necessary to coagulate a certain portion of latex. For this purpose to 1 ml of latex, 1 ml of radioactive calcium chloride $\text{Ca}^{45}\text{Cl}_2$ is added. The obtained coagulum is washed, burnt and the activity of the ash measured. The quantity of C^{24} in a mg-eq is calculated. This is the "calcium number". Table 2 shows that the quantity of calcium ion necessary for obtaining 1 g of coagulum does not depend on the concentration of the coagulating solution. Table 3 shows that it also does not depend on the concentration of the latex to be coagulated. The calcium number is a measure for the resistance of the latex to the action of electrolytes. The higher it is, the more electrolyte is needed for coagulating the latex. It can be used for revealing changes in the latexes during processing. The calcium

Card 1/2

69-20-1-11/20

Investigation of Coagulation of Rubber Latexes by Means of Radio-active Isotopes

number decreases during natural or accelerated aging, in dialysis and centrifugation; it is increased, on adding protective substances to the latex. In order to coagulate latex with an electrolyte forming an insoluble salt with the protector, it is sufficient for only a part of the latter to react.

There are 4 tables, and 2 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovykh izdeliy shirokogo potrebleniya, Moskva (Scientific Research Institute for Rubber Products for General Consumption, Moscow)

SUBMITTED: November 14, 1956

AVAILABLE: Library of Congress

Card 2/2

AUTHORS:

Sandomirskiy, D.M., Vdovchenkova, M.K.

69-58-2 -15/23

TITLE:

Investigation of the Ion Deposition of Rubber From Latex by Means of Radioactive Isotopes (Issledovaniye ionnogo otlozheniya kauchuka iz lateksa pri pomoshchi radioaktivnykh izotopov)

PERIODICAL:

Kolloidnyy zhurnal, 1958, Vol XX, Nr 2, pp 214-219 (USSR)

ABSTRACT:

The method of ion deposition is widely used in the manufacture of pilot balloons, gloves, etc. The relation between the resistance of the latex and the deposition value has, however, not been completely investigated. The distribution of the coagulating salt in the developing gel, and the character of interaction of this salt with the protective substance of the latex, is unknown. The calcium number is used as the measure for the latex resistance. This is the quantity of calcium ions binding 1 g of coagulum. It is determined by coagulating the latex with a $\text{Ca}^{45}\text{Cl}_2$ solution. The Characteristics of the investigated latexes are shown in the table. Figure 2 shows that the quantity of the deposited rubber increases with the concentration of the fixing agent. The calcium equivalent is not influenced by the concentration of the fixing agent.

Card 1/3

69-58-2.-15/23

Investigation of the Ion Deposition of Rubber From Latex by Means of Radio-active Isotopes

The calcium equivalent not only depends on the content of protective substance in the latex, but also on the resistance of the latex (figure 4 and 5). During natural and artificial aging HCl is set free and the resistance as well as the calcium equivalent is decreased. The experimental facts demonstrate that the lower the calcium equivalent, the greater the deposition speed and the greater the quantity of the deposited rubber. Figure 6 shows that the electrolyte quickly diffuses from the surface of the form through the developing gel.

There are 7 graphs, 1 table, and 10 references, 7 of which are Soviet, and 3 English.

Card 2/3

69-58-2 -15/23

Investigation of the Ion Deposition of Rubber From Latex by Means of Radioactive Isotopes

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovykh i lateksnykh izdeliy, Moskva (Scientific Research Institute of Rubber and Latex Products, Moscow)

SUBMITTED: December 28. 1956

1. Latex--Rubber ion deposition 2. Radioactive isotopes--Applications

Card 3/3

69-20-3-6/24

AUTHORS: Sandomirskiy, D.M.; Margolina, Yu.L.; Dogadkin, B.A.; Krokhina, L.S.

TITLE: Ionic Deposition From Carboxylic Divinylstyrene Latexes (Ionnoye otlozheniye iz karboksilsoderzhashchikh divinil-stirol'nykh lateksov)

PERIODICAL: Kolloidnyy zhurnal, 1958, vol XX, Nr 3, pp 293-297 (USSR)

ABSTRACT: The manufacture of rubber products immediately from latex by means of ion deposition is based on the interaction of the cations of the electrolyte diffused in the latex and the protective shell of the globules. The result of this interaction is the astabilization of the globules and the formation of a gel. Synthetic rubbers containing carboxyl groups in the molecule form very resistant vulcanizates. In the article, two carboxyl-containing divinylstyrene latexes are investigated with regard to ion deposition. It is shown that at an increase of the pH of the latexes from 4 - 10.1, the surface tension decreases from 54.2 - 40.1 dyn/cm. The change in viscosity is negligible in latexes containing 4 - 10% metacrylic acid. Graph 1 shows that an increase in the pH value causes a decrease in the speed of ion de-

Card 1/2

69-20-3-6/24

Ionic Deposition From Carboxylic Divinylstyrene Latexes

position. The increase of the pH also decreases the relative elongation and the ultimate swelling of the latex, but the tensile strength and the equilibrium modulus increase. In the process of ion deposition and the subsequent treatment of the films obtained, calcium chloride interacts not only with the protective substances of the latex globules but also with the carboxyl groups of the polymer molecules, which is the cause of the structurization. The calcium atoms may combine with two carboxyls in two different polymer molecules connecting them by stable chemical cross bonds. There are 5 graphs, 2 tables, and 4 references, 2 of which are Soviet and 2 English.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova (Moscow Institute of Fine Chemical Technology imeni Lomonosov). Nauchno-issledovatel'skiy institut rezinovykh i lateksnykh izdeliy, Moskva (Scientific Research Institute of Rubber and Latex Products, Moscow)

SUBMITTED: March 1, 1958
Card 2/2

1. Rubber products--Production 2. Latex--Applications 3. Ion
--Deposits--Processes

SANDOMIRSKIY, D. M., and VOYUTSKIY, S. S.,

"Colloid properties of latex systems."

report presented at the Fourth All-Union Conference on Colloidal Chemistry,
Tbilisi, Georgian SSR, 12-16 May 1958 (Koll. zhur., 20,5, p.677-9, '58, Tsubman, A.B)

SOV/138-59-4-4/26

AUTHORS: Sandomirskiy, D.M., Fogel', V.O., and Mayzelis, B.A.

TITLE: The Thermo-Physical Characteristics of Latex Foams, Gels, and Sponges (Teplofizicheskiye kharakteristiki lateksnoy peny, gelya i gubki)

PERIODICAL: Kauchuk i Rezina, 1959, Nr 4, pp 13-16 (USSR)

ABSTRACT: In order to design plant for processing latex through foams and gels into latex 'sponge' it is necessary to know the thermal diffusivity α (m^2/hour), the thermal conductivity ($\text{kcal} \cdot \text{m}^{-1} \cdot \text{hour}^{-1} \cdot \text{deg}^{-1}$) and the specific heat at constant volume c_v ($\text{kcal} \cdot \text{m}^3 \cdot \text{deg}^{-1}$) of the material at these different stages. A rapid method for measuring α and λ is necessary since the material properties change during a fairly short time. The specific heat c_v can then be calculated from $c_v = \lambda/\alpha$. A "universal calorimeter" was devised as shown in Figure 1, and consists of two co-axial, open-ended cylinders between which the latex foam is gel'd and vulcanised into a sponge. Heat is supplied by the spiral element (3) at the axis of the cylinders which is fed from a battery. One thermocouple (4) is mounted at mid-length on the thin walled inner cylinder and the other thermocouple Card 1/5 (5) is inserted into the sample material at the same level.

SOV/138-59-4-4/26

The Thermo-Physical Characteristics of Latex Foams, Gels, and Sponges

and at radius r from the axis. The couples are connected to a galvanometer through a change-over switch. The heating element is fed with a definite current so that the specific amount of heat q_w supplied to the specimen ($\text{kcal, m}^{-2}\text{hour}^{-1}$) can be determined while the temperatures at the two thermocouples t_1 and t_2 are logged against time of heating τ . The maximum w time of heating at which one can neglect heat losses from the external surface of the specimen (when the external radius R_2 is 5 times the internal radius R_1) can be calculated from Fourier criteria, and under these conditions the temperature rise of the inner cylinder wall t_1 to the temperature rise of the specimen t is a function w of r/R_1 , and the Fourier number as shown in Eq (1). The thermal conductivity can then be deduced from Eq (2) by using the Biot number Θ . The actual apparatus was constructed with $R_1 = 10.5$ mm, $r = 18$ mm and $L = 200$ mm. Table 1 gives the relationships required for the solution of Eq (2) under these conditions. F is found from $\Delta t/\Delta \tau$ and the coefficient of thermal diffusivity α from $\alpha = \frac{w}{F} R_1^2 / \tau$. Thermal conductivity λ follows from Eq (2). Experiments were made on "Revertex" foams,

Card 2/5

SOV/138-59-4-4/26

The Thermo-Physical Characteristics of Latex Foams, Gels, and Sponges

foamed or extended to three times the liquid volume by propeller stirring. The formulation contained thickening and gelating agents as for material intended for automobile seats. The coefficients α , λ and c_g of the foam were determined immediately after foaming in the mixer. The whole apparatus containing the foam was then placed in a heating chamber and the temperature raised to 60°C to gel the foam, after which the same coefficients were again determined. The temperature of the heating chamber was then raised to 143°C, and the gel vulcanised into a "sponge", and the thermal characteristics determined again in this state. Considerable scatter was experienced in the measurements on the foam or the gel because of the rapid change in their characteristics while the measurements were being made. The more stable vulcanised "sponge" gave consistent results. Kinetic curves of c_g , λ , and α

Card 3/5 against time τ are given for latex foams as mixed, and for

SOV/138-59-4-4/26

The Thermo-Physical Characteristics of Latex Foams, Gels, and Sponges

the gelating foams during syneresis, in Figures 2 and 3 respectively; the former curves were obtained using material which did not contain gelating agents. The course of these curves is explained from the structural changes in the material which takes place during the processes and they demonstrate that constant characteristics are not exhibited during the gelating and vulcanising stages. Because of this, determination of the thermal coefficients was made with foams five minutes after they were mixed and extended, and with gels thirty minutes from commencement of gelation without syneresis, which periods are similar to production conditions. Table 2 gives the values of α , λ and c_p for foam (extended to three times original liquid volume), of the gel at 60°C, and of the dry "sponge" from the same extension of foam at room temperature. Experimentally determined values are given in the table and also values calculated by an addition method working from the corresponding characteristics of latex, water and air. The difference between the experimentally determined values and the calculated values indicates that it is not

Card 4/5

SOV/138-59-4-4/26

The Thermo-Physical Characteristics of Latex Foams, Gels, and Sponges

possible to deduce values for other degrees of extension or at different temperature from one set of data, and that separate determinations should be made.
There are 3 figures, 2 tables and 8 references, 7 of which are Soviet and 1 German.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii
im. M.V. Lomonosova (The M.V.Lomonosov Institute of Fine
Chemical Technology, Moscow)

Card 5/5

15 (7), 15 (9)

AUTHORS:

Dogadkin, B. A., Sandomirskiy, D. M., SOV/64-59-5-8/28
Rasshivalina, K. I., Geller, T. I.

TITLE:

Production and Properties of a Varnish for Rubber Shoes by
Oxidation of Sodium Butadiene Rubber in Solution

PERIODICAL:

Khimicheskaya promyshlennost', 1959, Nr 5, pp 398 - 401 (USSR)

ABSTRACT:

A. I. Tsavetkov, S. I. Khodosh, and O. V. Baksht participated in the development of the process. In the oxidation of polybutadiene rubber or a vulcanizate of sodium butadiene rubber an oxidation product may be obtained which is utilized as a film former or serves for the manufacture of adhesive substances. Oxidation experiments were carried out with sodium butadiene rubber solutions in white spirit in order to obtain a varnish for rubber shoes on this basis. The oxidation experiments were made during a continuous passage of air through the solution. A temperature of 120° proved to be most suitable when using 11-12% solutions. The course of the process was determined as to the viscosity of the solution (Figs 3,4). Since a temperature increase does not only accelerate the destruction but also the structure formation, various substances such as ferric oleate, or ferric stearate, 2% captax + 5% benzoic acid, as well

Card 1/3

Production and Properties of a Varnish for Rubber
Shoes by Oxidation of Sodium Butadiene Rubber in
Solution

SOV/64-59-5-8/28

as pure benzoic acid, polyphenols, RPA-2, "renatsite", etc, were investigated. The most effective substances were the two iron salts (3.5 parts by weight/100 parts by weight (sodium butadiene rubber)) with the aid of which the desired consistency of the 12% solution of 16 centipoises in 8 hours at 100° (instead of within 15-16 hours at 120°) was attained, thus forming considerably less peroxide groups and volatile acids. 40 l/hour per 1 kg of solution was found as the optimum air supply velocity (at 100-120°) (Fig 5). Experiments with iron isotopes showed that in the oxidation iron is linked completely to sodium butadiene rubber, i.e. it does not only act as oxygen carrier (which needs further experiments). The influence exerted by the oxidation period on the properties of the finished varnish film (Fig 6, diagrams) was investigated. The best results were obtained from a varnish to which ferric stearate, 2% sulphur, and 2% thiuram (or 4% butyl cymate or 2% carbon-black) were added since said varnish dries at 100° in 30 minutes (and at 70° in 50 minutes with butyl cymate or carbonblack) and exhibits a correspondingly good adhesion on rubber shoes. On

Card 2/3

Production and Properties of a Varnish for Rubber
Shoes by Oxidation of Sodium Butadiene Rubber in
Solution

SCV/64-59-5-8/28

the basis of the results obtained in the zavod "Krasnyy Bogatyr"
("Krasnyy Bogatyr" Plant) a suitable plant was designed for the prod-
uction of a varnish for noncured rubber shoes (Fig 8). A de-
scription of the plant is given. There are 8 figures and 6
Soviet references.

Card 3/3

5(4)

SOV/69-21-1-19/21

AUTHORS: Sandomirskiy, D.M. and Vdovchenkova, M.K.

TITLE: The effect of the Viscosity of Rubber Latex on the Gelatinization Rate. (Vliyaniye vyazkosti kauchukovogo lateksa na skorost' zhelatinirovaniya)

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 1, pp 132-133 (USSR)

ABSTRACT: The rate of gelatinization of latex depends not only on the number of stabilizing ions but also on the rate of their diffusion determined by the viscosity of the medium. There are 1 graph and 2 references, 1 of which is Soviet and 1 English.

ASSOCIATION: Nauchno-Issledovatel'skiy institut rezinovykh i lateksnykh izdeliy. (The Scientific Research Institute of Rubber and Latex Goods).

SUBMITTED: May 22, 1958

Card 1/1

75.7210
15.9300

SOV/69-21-6-9/19

5

AUTHOR: Sandomirskiy, D.M. and Korotkova, A.A.

TITLE: Studies on Latex Foams ✓

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol 21, Nr 6, pp 679-685 (USSR)

ABSTRACT: The present study is devoted to the problem of stability and other properties of latex foams. The authors report on some results obtained during the investigation of the foaming capacity of butadiene styrene latexes. ✓ Analogous data were obtained for a number of other synthetic latexes, so that the results have a sufficiently general character. As criterium of the foaming capacity of latex the authors first used the "ultimate" height of the foam column h_0 reached prior to desintegration of the foam (proposed by A.V. Dumanskiy /Ref 2/7). If the lifetime of a foam bubble is equal to τ and the velocity of the air entering through a capillary into the liquid is equal to u , foam will

Card 1/6

SOV/69-21-6-9/19

Studies on Latex Foams

accumulate up to the formation of a column of the height $h_0 = u\tau$. Evidently the magnitude h_0 depends on the properties of the system and can serve as a characteristic of its foaming capacity. Foam formation was carried out with a device illustrated by diagram 1. From a graduated cylinder 1 (250 mm) filled to above the highest mark water with established velocity controlled with cock 2 flows through cock 3 into bottle 4, from where it forces out the air. The velocity of the air is measured with flow meter 5, the pressure - with manometer 6. Cock 7 serves to adjust the device to a definite velocity of the air. The stopper of cock 8 has two perpendicularly arranged openings corresponding to the two branch conduits of the crane. The left branch conduit, which ends in a capillary, is introduced into the stopper of the foaming vessel 9, the right - connects the device with the atmosphere (for further particulars see article).

Card 2/6

SOV/69-21-6-9/19

Studies on Latex Foams

The preparation of foam from various latexes at different velocities of the air proved that the "ultimate" foam volume is not unambiguous for a given system, because it strongly depends on the speed of the air blown through. The higher the speed of the air, the higher the foam volume and the faster the disintegration of the foam. Table 1 gives the results obtained during foaming of butadiene styrene latex SKS-30 of various concentration and of a nekal solution (emulsifier in this latex) at different velocities of the air. Table 1 shows that the product of the "ultimate" foam volume V and the time t (Vt) (t is equal to the lifetime of a single foam bubble), does not depend on the speed of the air and can serve as a characteristic for the foaming capacity of a given system. The authors further prove that the magnitude Vt is determined by the physico-chemical properties of the liquid to be foamed. Starting from the assumption $Vt = V_{1nt} = \text{const}$

Card 3/6

SOV/69-21-6-9/19

Studies on Latex Foams

(V_t is equal to the product of the volume V_1 (ultimate size of a single bubble), the presumably constant number n of the bubbles and the time t) and considering three forces (lifting force of the bubble, vertical component of the surface tension retaining the bubble at the capillary, viscous resistance of the liquid) counteracting the take-off of the bubble from the capillary the authors finally deduce the equation

$$V_t = V_1 n t = \frac{2\pi\sigma \frac{n^2}{r} + \eta S \frac{du}{dz}}{(D-d)g} n t \quad (8)$$

(D - liquid density, d - air density, g - acceleration of gravity, r - capillary radius, σ - surface tension at interface liquid - air, η - bubble radius)

Dard 4/6

SOV/69-21-6-9/19

Studies on Latex Foams

dius, η - viscosity of the liquid, S - contact surface bubble-liquid, du/dz - gradient of the velocity of the movement of the liquid layers), which fully characterizes the foaming capacity of a system. The authors further report on their investigation of the dependence of the properties of latex SKS-50N on concentration (Figure (Graph) 2) and glycerine content (viscosity) (Figure (Graph) 4) and also of the effect of surface active substances on the foaming capacity of dialyzed latex SKS-50N (Table 2). It was found that in a sufficiently concentrated latex viscosity appears as the basic factor determining the stability of the foam. There are 4 graphs, 2 tables, 1 diagram and 16 references, 8 of which are Soviet, 6 English, 1 German and 1 French.

Card 5/6

SOV/69-21-6-9/19

Studies on Latex Foams

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovykh i latek-
snykh izdeliy, Moskva (Scientific Research Institute
of Rubber and Latex Products, Moscow) 4

SUBMITTED: May 27, 1958

Card 6/6

S/138/60/000/009/004/012
A051/A029

15.9360 2109, 1526, 1451

AUTHORS: Dostyan, M.S.; Sandomirskiy, D.M.; Uzira, R.V. 15

TITLE: An Investigation Into the Effect of the Adhesive Properties on the Bond Stability in the Cord-Adhesive-Rubber System

PERIODICAL: Kauchuk i Rezina, 1960, No. 9, pp. 20 - 26.

TEXT: The authors conducted a study on model systems of adhesive-cord (cellulose) and adhesive-rubber in order to determine the role played by each factor in fabric processing, i.e., by the properties of the adhesive film itself, or by the interaction of the adhesive with the fabric or with the rubber lining. The cellulose film used in the study was produced from regenerated viscose on a textile lining (percal), according to a method developed by VNIIV. The width of the film was 0.2 mm and the adhesive layer was applied to the film by impregnation and subsequent drying at 125 - 135°C. Butadiene-styrene-based latexes,¹⁵ such as CKC - 30Ш (SKS-30Sh) and CKC-30-1 (SKS-30-1) with different content of methacrylic acid, were used as the objects of investigation. As components of the impregnation compositions the following substances with polar functional groups were used: proteins (casein, albumin, gelatin), resorcin- and phenol-formaldehyde resins, sulfur, water-soluble accelerators and active fillers in the form of dispersions
Card 1/4

S/138/60/000/009/004/012

A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability in the Cord-Adhesive-Rubber System

of channel gaseous carbon black. These were investigated as to their role and nature of interaction with the combining surfaces, i.e., the cord and rubber. The following conclusions were drawn: compounds with polar functional groups increase the stability of the bond between the adhesive and the surfaces in the model systems and the physico-mechanical properties of the adhesive layers. Active fillers of the channel carbon black type, accelerators and also latexes containing carboxylic groups in the molecular chain of the polymer increase primarily only the physico-mechanical properties of the adhesive layers. The weak spot in the system is the boundary-line adhesive-rubber and the adhesive layer (Refs. 4,8,). The bond is not broken at the boundary adhesive-cord. Thus, the attention in improving the properties of the impregnation compositions should be directed at: 1) increasing the bond stability at the adhesive-rubber interface, 2) increasing the physico-mechanical properties of the adhesive layer. The bond stability at the adhesive-rubber interface is determined by both the properties of the adhesive and the rubber. Experimental data show that the main effect on the bond stability increase at the adhesive-rubber interface is obtained from the presence of substances with polar functional groups in the adhesive, and the occurrence of intramolecu-

Card 2/4

S/138/60/000/009/004/012
A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability
in the Cord-Adhesive-Rubber System

lar interaction forces between the functional groups of the adhesive and the rubbers of the van der Waal's or hydrogen type brought on by these forces. These forces can occur only in sufficiently close position of the adhesive and rubber substances to each other. Therefore the diffusion processes and compatibility of the polymers probably affect the bond stability (Ref. 9). A study of the adhesive film properties depending on the composition showed that a high modulus at low deformations (up to 100%) is characteristic of the impregnation films. Thus, the films of the effective impregnation materials have a modulus of no less than 20 - 30 kg/cm² at an elongation of 50% (the model of casing rubber in similar deformations is not above 10 - 12 kg/cm²). With an increase in the film modulus the bond stability of the system increases (Ref. 3). Based on conducted experiments it is assumed that the high-modulus adhesive layer plays the part of the linking bridge between the cord and the low-modulus rubber and accepts part of the tensions occurring in the system, which works under conditions of repeated deformations. Properties of the films such as tear-resistance, temperature-resistance and thermal resistance have a great effect on the increase in the system's resistance. Thus, the strengthening of the adhesive film is one way of improving the properties of

Card 3/4

S/138/60/000/009/004/012
A051/A029

An Investigation Into the Effect of the Adhesive Properties on the Bond Stability in the Cord-Adhesive-Rubber System

the impregnation materials. Based on modelling the cord-adhesive-rubber system, it was shown that the components introduced into the impregnation compositions must comply with the following conditions: 1) ensure a high bond stability mainly at the adhesive-rubber interface. Substances containing polar functional groups may act as these components. 2) Ensure a complex of physico-mechanical properties of the adhesive films, such as a high modulus (no lower than 20-30 kg/cm²) in the region of deformation of 50 -100%, a high tear-resistance, thermal stability and temperature stability. The application of active fillers, latexes with functional groups in the polymer chain, and in some cases, vulcanization accelerators, help to increase the adhesive film properties to the greatest extent. A rational selection of the impregnation composition, which would ensure an increase in the bond stability in the system cord-adhesive-rubber, can be accomplished by the simultaneous introduction of substances with polar functional groups and active fillers into the latex. There are 7 figures, 2 tables, 9 references: 8 Soviet, 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific-Research Institute of the Tire Industry).
Card 4/4

SANDROMIRSKIY, D.M.; SPEKTOR, E.M.

Vulcanization of polychloroprene latexes. Part 1: Vulcanization
by means of hydrolsis. Vysokom. soed. 2 no.8:1221-1226 Ag '60.
(MIRA 13:9)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im.
M.V. Lomonosova i Zavod "Krasnyy bogatyr".
(Chloroprene)

68705

S/069/60/022/01/012/025

Sandomirskiy, D.M., Vdovchenkova, M.K.

15.9110
AUTHORS:

Radioactive Indicator Study of the Gelation¹⁵ of Rubber Latexes

TITLE:

PERIODICAL:

Kolloidnyy zhurnal, 1960, Vol XXII, Nr 1, pp 69-73 (USSR)

ABSTRACT:

The authors report on a study of the gelation of a number of latexes with the aid of $Zn^{60}O$. They used the polychloroprene latexes nairit L-3¹⁵ and L-4, butadiene styrene latex SKS-50 and a polychloroprene latex stabilized with sodium paraffinate and sodium salt of tridecylic acid (latex VKh-2). In order to clarify, whether and to what extent during the gelation of latex chemical linkage of the introduced zinc takes place, the gels were washed with a solution of ammonium nitrate and the radioactivity of the latter was determined. The washed and dried gel was burnt in a muffle furnace, and the activity of the ashes was determined in the usual way. It was found that during

Card 1/3

68705

S/069/60/022/01/012/025
D034/D003

Radioactive Indicator Study of the Gelation of Rubber Latexes

gelation part of the zinc was firmly linked to the gel and could not be extracted by washing the gel with the ammonium nitrate solution. The amount of bound zinc depends on the type of latex. In latex L-4 0.94 mg-equ of zinc are linked per 1 g rubber, in L-3 - 0.69, in SKS-50 - 0.52, and in VKh-2 0.61 mg-equ are linked. It was further shown that the amount of bound zinc does not depend on the dosing of gelatinizing agents and that it diminishes during artificial aging and dialysis of the latex. On diluting the latex, the zinc equivalent increases due to the formation of looser gels. During gelation 84-95% of the protective agent - the above described phenomena occurred on the basis of interaction of the protective substances of the latex with zinc-ammoniac ions, which resulted in the formation of water insoluble zinc salts - is converted to insoluble salt; i.e. considerably more

Card 2/3

68705

S/069/60/022/01/012/025
D034/D003

Radioactive Indicator Study of the Gelation of Rubber Latexes

than during ionic deposition (ca 38%) or coagulation (ca 26%). This is explained by the acceleration in the same sequence of latex astabilization and the formation of denser structures. It has been confirmed with the aid of electronic microphotographs that during aging and dialysis of the latexes aggregation of the globules takes place. The microphotographs were taken by B.V. Shtarkh. There are 2 graphs, 2 tables, 1 insert with 4 electronic microphotographs and 9 references, 6 of which are Soviet, 2 English and 1 French.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovykh i lateks-nykh izdeliy, Moskva (Scientific Research Institute of Rubber and Latex Products, Moscow)

SUBMITTED: May 20, 1958

Card 3/3

15.9210 15.9300

69462

S/069/60/022/02/002/024
D034/D002

AUTHORS: Voyutskiy, S.S., Sandomirskiy, D.M., Fodiman, N.M.,
Panich, R.M., Ustinova, Z.M.

TITLE: Studies on the Mechanism of Film Formation From Vul-
canized Latex. 2. The Formation of Films From SKS-30
ShKhP Butadiene-Styrene Latex

PERIODICAL: Kolloidnyy zhurnal, 1960¹⁵, Vol XXII, Nr 2, pp 143-147
(USSR)

ABSTRACT: The authors report on an investigation into the mech-
anism of the formation of films from vulcanized and un-
vulcanized synthetic latex. Object of the study was
SKS-30 ShKhP butadiene-styrene latex, which contains
35.5% dry substance. As stabilizer the authors used
paraffinic acid ammonium salt. They determined the
effect on the tensile strength of such factors as the
swelling of the films in water vapors and vaseline oil,

Card 1/3

69462

S/069/60/022/02/002/024
D034/D002

Studies on the Mechanism of Film Formation From Vulcanized Latex.
2. The Formation of Films From SKS-30 ShKhP Butadiene-Styrene
Latex

the test temperature, and the behavior of the films during mastication. The method of the investigation was described in a previously published paper / Ref. 1/. The study has shown that the strength of unvulcanized synthetic latex films is determined primarily by Van-der-Waal forces, whereas the strength of films from vulcanized latex and of films vulcanized in a dry state is the result of a continuous molecular network typical for vulcanizates. The introduction of casein into synthetic latex brings a number of properties of the films obtained therefrom close to those observed in films from natural latex. There are 2 graphs, 1 table and 2 Soviet references.

Card 2/3

69462

S/069/60/022/02/002/024

D034/D002

Studies on the Mechanism of Film Formation From Vulcanized Latex.
2. The Formation of Films From SKS-30 ShKhP Butadiene-Styrene
Latex

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii
im. M.V. Lomonosova, Laboratoriya elastomerov, (Moscow
Institute of Fine Chemical Technology imeni M.V.
Lomonosov, Laboratory of Elastomers)

SUBMITTED: January 27, 1959

Card 3/3

S/190/60/002/008/010/017
B004/B054

AUTHORS: Sandomirskiy, D. M., Spektor, E. M.

TITLE: Study of Vulcanization of Polychloroprene Latexes. I. Vulcanization by Hydrolysis

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 8, pp. 1221-1226

TEXT: Among Soviet latexes, only the polychloroprene latexes (nairits) Л-3 (L-3), Л-4 (L-4), and Л-7 (L-7) are similar to natural latex as to strength of the gel and adhesiveness of the film. Their vulcanization by MgO or ZnO, however, is not possible because of gelatinization and coagulation. Proceeding from a reaction scheme suggested by D. E. Andersen and P. Kovacic (Ref. 6), the authors assume that the hydrolysis occurring in the polymer structuration can be used to vulcanize polychloroprene latexes. They studied the hydrolysis of nairit L-4 on two samples: Latex I made in April, 1957, and Latex II made in November, 1958. Films were made of the initial latexes, and tested for tensile strength, relative elongation, and residual elongation. The process of hydrolysis (separation of chlorine

Card 1/2

Study of Vulcanization of Polychloroprene Latexes. S/190/60/002/008/010/017
I. Vulcanization by Hydrolysis B004/B054

into the latex serum) was controlled by potentiometric titration of the latex by AgNO_3 (carried out by S. S. Guseva). The hydrolysis was studied under the following conditions: a) hydrolysis by aging (Latex I, 24 months); b) hydrolysis by heating (Latex II, 25 h to 95°C); c) hydrolysis by heating and adding 2 parts by weight of KOH. Films were again made of the latexes thus treated, and tested. The results are: The hydrolysis of nairit latexes produces changes in the physical and mechanical properties of films similar to those occurring in vulcanization. The tensile strength increases without a change in relative elongation. An addition of alkali and a temperature increase accelerate this process which may be considered to be a kind of "vulcanization". There are 3 figures, 2 tables, and 14 references: 7 Soviet, 5 US, 1 British, and 1 German. ✓

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im.
M. V. Lomonosova (Moscow Institute of Fine Chemical Techno-
logy imeni M. V. Lomonosov). Zavod "Krasnyy Bogatyr'"
("Krasnyy Bogatyr'" Plant)

SUBMITTED: March 30, 1960

Card 2/2

89596

15.9300

11.2320

S/138/60/000/011/002/010
A051/A029

AUTHORS: Sandomirskiy, D.M., Pil'menshteyn, I.D.

TITLE: A Study on the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

PERIODICAL: Kauchuk i rezina, 1960, No. 11, pp. 5-11

TEXT: The authors stress the fact that the gelatinization of rubber latexes and their mixtures with zinc oxide in the presence of ammonium salts is a process in which only the chemical reactions taking place in this mechanism have been studied and not the transformation of the liquid latex to a solid gel, although the latter has a practical significance in determining the possibilities of filling molds. An instrument based on the same principle as that of the Veyler and Rebinder instrument (Ref. 9) for studying the changes in the structural and mechanical properties of latexes during the gelatinization process was designed by the authors (Fig. 1). The instrument can be used for measuring the shift tensions occurring in the latex which gelatinizes depending on the deformation value at a constant rate of the latter. The instrument consists of AEB-200 (ADV-200) analytic-

Card 1/16

89596

S/138/60/000/011/002/010
A051/A029

A Study on the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

al scales, on one arm of which a stainless steel plate (2) 20 x 20 x 2 mm with grooves on both sides is suspended. The plate is placed in a cuvette (3) of rectangular cross section made of stainless steel with a thickness of the walls of 2 mm and is located parallel to the walls of the cuvette at a distance of 4 mm from them. The cuvette is fastened to the thermostat (4), through which water is passed at a constant temperature by means of an ultrathermostat. The thermostat with the cuvette is fastened on a metallic platform (5) suspended on a caprone thread (6), the thread passes through a system of pulleys (7) and is wound around a drum sitting on the reductor's axis, rotated by a small motor (Warren type) (8). When the thread unwinds from the drum, the platform with the thermostat moves down at a constant rate along the guiding poles (9). The platform (10) on the dial of the scales is meant for weights used for reducing the sensitivity of the scales. The measurements were carried out in the following manner: the latex mixture being investigated was poured into the cuvette to which a plate was introduced, the scales were unlocked, the motor connected in, the

Card 2/16

89596

S/138/60/000/011/002/010
A051/A029

A Study on the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

thermostat with the cuvette moved down and in the space between the cuvette and plate shift stress was created, which was either recorded visually by the dial movement of the scales or by means of a photoelectric pickup (11) with a potentiometric automatic ЭПМ-09 (EPP-09) recorder (the time required by the carriage to move through the dial was 8 sec.). The investigation was carried out on a natural latex concentrate produced by centrifuging (qualitex) and on chloroprene latex (nairite) L-4 - L-4). The zinc oxide paste was prepared on a ball-mill for a period of 50 hours. Fig 2 shows the relationship of the shift tension to the relative shift deformation in gelatinizing natural and chloroprene latexes recorded on a paper band of the self-recording potentiometer. The clear maximum of the shift tension P_k for the natural latex points to the fact that in gelatinization specific structures occur in this latex. Another pattern of behavior is observed for L-4 (Fig. 2). The absence of a maximum of the shift tension proves that in this latex in gelatinization only an increase in the elasticity occurs. The change in the structural and mechanical properties of the mixture

Card 3/16

89596

S/138/60/000/011/002/010
A051/A029

A Study on the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

during gelatinization from the natural latex was investigated and also that of the chloroprene latex (Fig. 3). It is seen from the graph that both the stability of the formed structure P_K and the elasticity of the destroyed structure η_{∞} of the gelatinizing latex mixtures increase rapidly with an increase in the gelatinizing period. Fig. 4 shows that P_K and η_{∞} to a great extent depend on the concentration of the latex mixture increasing with an increase in the latter. Fig. 5 shows the effect of temperature on the kinetics of the change in P_K and η_{∞} in the gelatinization of the qualiter. It is further shown mathematically that the rate of increase in the stability of the occurring structures in the gelatinizing mixture can be expressed by the equation: $\frac{d P_K}{dt} = k \cdot f(P_K), \quad (1)$

where t is the time, k the constant of the process rate, $f(P_K)$ the positive function of P_K . By integrating from 0 to t , the equation $k = \frac{1}{t} \cdot F(P_K)$

Card 4/16

89596

S/138/60/000/011/002/010
A051/A029

A Study of the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

(2), is obtained, where $F(P_K)$ is the new function of P_K from which it is assumed that the dependence of k on the temperature would be expressed by an equation similar to that of the Arrhenius equation: $k = A \cdot e^{-E/RT}$ (3). If the function $F(P_K)$ does not change with a change in the temperature, then at equal P_K and for various temperatures of T_1 and T_2 the following ratio is obtained: $\frac{k_{T_1}}{k_{T_2}} = \frac{t_{T_2}}{t_{T_1}}$ (4). Fig. 6 shows that the relationship of \ln

$1/t$ to the reverse value of the absolute temperature is a straight line, i.e., equations (2) and (3) are proven to be just. The assumed activation energy determined from equation (3) was found to be 26.2 kcal. The value of $1/t$ was determined at different temperatures for two values of P_K 50 and 100 dyne/cm². The relationships obtained for these two values of P_K of $\ln 1/T$ form one straight line. This was taken as proof that the mechanism of the structural formation is the same at various temperatures and at different moments of the gelatinization. Fig. 7 shows the relationship of P_K to

Card 5/16

89596

S/138/60/000/011/002/010
A051/A029

A Study of the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

the quantity of ammonium chloride introduced into the latex at a constant amount of zinc oxide and constant concentration of the rubber. The obtained data showed that the beginning with an increase in the amount of zinc oxide both an increase in the gelatinization rate and the stability of the produced structures (P_k) took place, but with the subsequent increase in the zinc oxide quantity the gel-formation slowed down and the stability of the structure became less. The authors claim that the results of their experiments help to explain the difference in the gelatinization process of the natural and chloroprene latexes in rotating molds. In the case of the natural latex a gel was obtained equally distributed along the internal wall of the spherical mold. In the case of the nairite latex the wall was usually covered with a very thin rubber film and almost all of the dry mass of the latex was collected into one gelatinated or coagulated lump. This difference is thus explained: Immediately after introducing zinc oxide and a solution of ammonium chloride into the natural latex, the process of structure formation begins, noted from the occurrence of the shift tension

Card 6/16

89596
S/138/60/000/011/002/010
A051/A029

A Study of the Structural and Mechanical Properties of Rubber Latexes in Gelatinization

maximum in the shift deformation. The characteristic feature of these structures is their thixotropic properties, i.e., under mechanical stress they easily decompose and are restored within a time limit less than that required for the gelatinization. The introduction of gelatinizing agents into the chloroprene latex does not cause the formation of any structures and only at the end of the process brings about a severe increase in the elasticity. The rate of the elasticity increase at the end of the gelatinization process is so great that the gel's setting time becomes less than one complete revolution of the mold. This leads to the fact that the mixture cannot be equally distributed within the hollow of the mold and pieces of coagulum are formed. It is assumed that in this case the uneven distribution of the zinc oxide within the entire volume of the mixture occurs. There are 8 graphs, 1 diagram and 12 references: 5 Soviet, 7 English.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova (Moscow Institute of Fine Chemical Technology im. M.V. Lomonosov).
Card 7/16

89596

SANDOMIRSKIY, D.M.; KORSUNSKIY, B.L.

Ionic deposition of rubber from latexes. Kauch.i rez. 20 no.5:
15-20 My '60. (MIRA 14:5)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.
Lomonosova.

(Latex)

S/069/60/022/006/008/008
B013/B066

AUTHORS: Sandomirskiy, D. M. and Pil'menshteyn, I. D.

TITLE: Causes of Gel Formation in Rubber Latex

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol. 22, No. 6, pp. 759-761

TEXT: In the present letter to the editor the authors report on their attempt of visually observing the processes which take place during the gel formation in natural latex on introduction of zinc oxide paste in the presence of ammonia. They were able to photograph the several stages of the gel formation in latex by means of a MKY-1 (MKU-1) microfilm camera with a 950-fold magnification. They found that the coagulum increases round each zinc oxide particle. This is the result of the formation of zinc ammonia ions on the surface of these particles and of their diffusion into latex. The growing coagulum gives rise to the formation of a space-lattice in the entire latex volume. This is not composed of chains of globulae which adhere to one another in some points, but of ordinary coagulum. According to the authors' opinion, the difference between gel and coagulum in the case of rubber-latex does not exist in

Card 1/2

89589

S/190/61/003/002/007/012
B101/B215

15-9120

AUTHORS: Sandomirskiy, D. M., Spektor, E. M.
TITLE: Study of the vulcanization of polychloroprene latexes.
II. Sulfidizing
PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 2, 1961,
255-261

TEXT: It was the purpose of the present work to simplify the vulcanization of polychloroprene (PCP) so that the final product, the PCP film, no longer separates HCl when stored. The JI -4 (L-4) PCP latex nairit was used for the experiments. Alkali polysulfides were found to react with L-4 latex already at temperatures (20-90°C) at which no reaction occurs with natural latex. This interaction therefore was studied in detail. Films of sulfidized latex underwent the following procedures: 1) physicomechanical examination by traditional methods; 2) determination of expansion in benzene; 3) determination of flow at constant elongation; 4) determination of the T-50 index expressing the crystallizability at lower temperatures,

Card 1/11

89589

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of...

and the degree of vulcanization by the T-50 (T-50) apparatus of the zavod "Krasnyy bogatyr'" ("Krasnyy bogatyr'" Plant). For 6 min the films were cooled down to -60°C ; initial elongation: 500%. Melting took place at a rate of 2 degr/min, the relative elongation was measured after every 5°C . 5) Determination of bound sulfur by washing out of unbounded polysulfides, determination of the S remaining in the film, and that contained in the initial latex by Kjeldahl's method. Table 1 gives the data of the film precipitated by CaCl_2 (latex first had been diluted to 30%). A) The interaction of polysulfides and PCP latex nairit L-4 at 90°C (one portion by weight of S in the form of K_2S_5 per 100 weight portions of dry substance of L-4) showed that an intensive decomposition of polysulfide is accompanied by the liberation of H_2S so that no constant concentration of polysulfide was found. Hence B) examination of the interaction at room temperature (two portions by weight of S per 100 portions of dry substance, larger additions of sulfur deteriorated the film formation). The reaction thus occurring between polysulfide and latex was also found in (KC -30)

Card 2/11

89589

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of...

(SKS-30Sh) latex. The following reaction is therefore assumed: $K_2S_5 + \frac{3}{2}O_2 \rightarrow Na_2S_2O_3 + 3S$, which is activated by the globuli of latex, the polymerization initiators contained in it, etc. C) Since thiosulfate thus proves to be a component of the process, its interaction with L-4 and thiosulfate was examined at room temperature (three portions by weight of $Na_2S_2O_3$ per 100 portions by weight of dry substance of L-4). The results are depicted in the following diagrams. Fig. 2: kinetics of the interaction polysulfide - latex; Fig. 3: expansion of the film obtained by polysulfide, in benzene; Fig. 4: tensile strength and T-50 index of the film of latex treated by thiosulfate; Fig. 5: kinetics of the interaction latex - thiosulfate. The discussion of the results led to the following conclusions: 1) K_2S_5 enters into reaction with two chlorine atoms of the allyl group thus initiating cross linking of the polymer chain by a chain of 5 S atoms (reaction I); 2) Na_2SO_3 only reacts with a 1.2 bond under the formation of Bunte salt (reaction II). Further reactions led to the decomposition of

Card 3/11

89589

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of...

Bunte salt, liberation of sulfur, and cross linking. The resistance to frost of the latex (T-50 index) treated with polysulfide is shown in Fig. 6. The accumulation of sulfur is terminated in section A β . Sulfur is accumulated as Bunte salt (thus decreasing the mobility of the chains), or in the form of polysulfide cross links consisting of five S atoms. T-50 does not change in this section. An increase in the resistance to frost occurs in section B β due to the decomposition of Bunte salt into disulfides, decomposition of polysulfide chains, and accumulation of S on the double bonds. The decrease in the swelling power in benzene corresponds to this section. The second increase of the T-50 index in section B β has not been explained. A comparison of the diagrams with Figs. 2 and 5 shows that 75% of sulfur is accumulated after reaction I. Stabilization of the polymer is due to the fact that the whole amount of allyl chlorine is substituted by S after 4 hr. The removal of unstable chlorine from PCP therefore becomes successful by the above method at room temperature. There are 6 figures, 2 tables, and 22 references: 13 Soviet-bloc and 9 non-Soviet-bloc. The three references to English language publications read as follows: D. E. Andersen, P. Kovacic, Industr. and Engng. Chem. 47, 171, 1951; P. Kovacic, Industr. and

Card 4/11

89589

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of...

Engng. Chem. 47, 1090, 1955; A. Chiesa, Rubb. Chem. Techn., 27, 648, 1954.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii (Moscow
Institute of Fine Chemical Technology). Zavod "Krasnyy
bogatyry" ("Krasnyy bogatyr" Plant)

SUBMITTED: July 3, 1960

Card 5/11

89589
S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of...

Table 1: Data of the film obtained by ionic precipitation from initial latex nairit L-4. Legend: 1) treatment of the films; 2) modulus (300%), kg/cm²; 3) modulus (500%), kg/cm²; 4) tensile strength, kg/cm²; 5) elongation, %, a) relative; h) residual; 6) T-50 index, °C; 7) maximum expansion in benzene, %; 8) before 9) after thermal vulcanization;

Основные характеристики пленок, полученных ионным осаждением из исходного латекса наирит Л-4

Обработка пленок (1)	Модуль (300%), кг/см ² (2)	Модуль (500%), кг/см ² (3)	Сопротивление разрыву, кг/см ² (4)	Удлинение, % (5)		T-50 °C (6)	Максимальное набухание в бензоле, % (7)
				относительное (a) (5a)	остаточное (h) (5h)		
До термовулканизации	11,3	22,8	115,0	950	8	-10	750
После термовулканизации	9,9	16,0	91,5	1000	4	—	620

Card 6/11

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of

Fig. 2: Kinetics of the accumulation of sulfur on latex polymer, and change in the flow of films (time of deformation: 20 days) when consisting of latex L-4 and polysulfides.

Legend: 1) accumulation of S; 2) flow;
a) time of reaction, days; b) flow, %

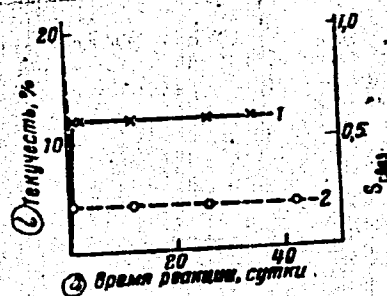


Рис. 2

Card 7/11

89589

S/190/61/003/002/007/012
B101/B215

Study of the vulcanization of ...

Fig. 3: Change in the maximum expansion of films in benzene with mixtures consisting of latex L-4 and polysulfides.
Legend: 1) before, 2) after thermal vulcanization; a) time of reaction, days;

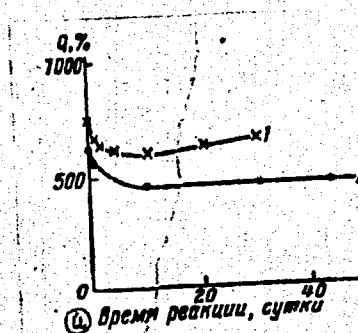


Рис. 3

Card 8/11